AMENDMENT TO THE CLAIMS

1. (currently amended) An air bearing slider comprising:

a slider body including a leading edge, a trailing edge and opposed sides and including an elongate length between the leading and trailing edges ~~forming~~having a leading edge portion, a trailing edge portion and an intermediate portion proximate to a center axis of the slider body and a cross width between the opposed sides and the slider body including a center portion and opposed side portions;

a raised bearing surface or surfaces including a center portion along the leading edge portion of the slider body ~~having a narrow cross width within the center portion of the slider body~~having a gap in a cross width direction within the center portion of the slider body and a bearing surface or surfaces within the intermediate portion ~~and a raised bearing surface or surfaces along the intermediate portion~~ having an expanded cross width relative to the cross width of the ~~raised bearing surface or surfaces along the leading edge portion of the slider body~~ center portion; and

a stepped bearing surface or surfaces recessed from the raised bearing surface or surfaces and the stepped bearing surface or surfaces having a cross width profile that includes a narrowing cross width dimension that narrows in a direction towards the trailing edge of the slider body from the intermediate portion.

2. (cancelled)

3. (previously presented) The slider of claim 28 wherein the divergent bearing surface or surfaces include opposed side rails angled outwardly in a direction of the trailing edge .

4. (currently amended-withdrawn) The slider of claim ~~28~~12 wherein the ~~intermediate portion~~ raised bearing surface or surfaces includes a ~~raised~~ cross rail ~~forming the raised bearing surface or surfaces~~ along ~~the~~an intermediate portion of the slider body.

5. (currently amended-withdrawn) The slider of claim 4 wherein the ~~raised~~ cross rail includes opposed side portions and the opposed side portions of the ~~raised~~ cross rail include leading edge trenches to pressurize the raised bearing surface or surfaces of the raised cross rail.

6. (currently amended - withdrawn) The slider of claim ~~28~~12 wherein ~~the~~an intermediate portion of the slider body includes a stepped cross rail forming ~~the~~a stepped bearing surface or surfaces along the intermediate portion of the slider body.

7. (currently amended) The slider of claim 28 wherein the divergent bearing surface or surfaces include ~~raised~~ bearing rails on opposed sides of a cross axis of the slider body along the intermediate portion of the slider body and the ~~raised~~ bearing rails angle outwardly in a direction toward the trailing edge of the slider body ~~to form the narrow leading edge cross width along a leading edge portion and the expanded intermediate cross width along the intermediate portion of the slider body~~.

8. (currently amended) The slider of claim 7 wherein the ~~raised~~ bearing rails extend from athe ~~raised~~ center portion and the slider includes a stepped bearing surface elevated from the cavity surface having a narrow cross width along the leading edge portion and an expanded cross width along the intermediate portion of the slider body, wherein the ~~raised~~ bearing rails and the ~~raised~~ center portion are formed on the stepped bearing surface.

9. (previously presented - withdrawn) The slider of claim 1 wherein the slider body includes a cavity surface or surfaces recessed below the raised bearing surface or surfaces and the leading edge portion includes opposed corner portions proximate to the opposed side portions and the trailing edge portion includes opposed corner portions proximate to the opposed side portions and each of the opposed corner portions forms the cavity surface or surfaces.

10. (currently amended - withdrawn) The slider of claim ~~28~~4 wherein the intermediate portion includes a stepped cross rail having a shortened length dimension along the intermediate portion of the slider body and an expanded stepped cross dimension.

11. (cancelled)

12. (currently amended) An air bearing slider comprising:

a slider body having a leading edge, a trailing edge, opposed sides and a cross width between the opposed sides;~~ and~~

a raised bearing surface or surfaces elevated above a recessed surface or surfaces and the raised bearing surface or surfaces including a center portion having a narrow cross width spaced from opposed sides of the slider body along a leading edge portion of the slider body and a ~~raised~~ center portion spaced from opposed sides proximate to the trailing edge of the slider body; and

a trench proximate to the center portion of the raised bearing surface or surfaces along the leading edge portion of the slider body and a leading edge step and opposed side steps from the trench to the center portion along the leading edge portion of the slider body.

Claims 13-14 (cancelled)

15. (currently amended) The slider of claim 12 wherein the raised bearing surface or surfaces include divergent bearing rails or surfaces which extend outwardly from ~~a~~the ~~raised~~ center portion along the leading edge portion of the slider body.

16. (previously presented) The slider of claim 15 wherein the divergent bearing rails or surfaces are formed on a stepped bearing surface along an intermediate portion of the slider body.

Claims 17-19 (cancelled)

20. (currently amended) An air bearing slider comprising:
a slider body including a leading edge, a trailing edge and opposed sides; and
bearing surface means on the slider body for limiting off-~~-~~nodal pressurization.

21. (currently amended) An air bearing slider comprising:
a slider body having a leading edge, a trailing edge and opposed sides;
a raised bearing surface or surfaces including a center portion along a leading edge portion of the slider body having ~~a perimeter surface profile including~~ a narrow leading edge cross width~~,~~ and including side portions extending outwardly from the center portion within an intermediate portion of the slider body ~~an expanded intermediate cross width and a trailing edge profile having a narrow cross width relative to the expanded intermediate cross width~~ and a ~~raised~~ center pad proximate to the trailing edge spaced from opposed sides of the slider body;~~ and~~
a stepped bearing surface proximate to the ~~raised~~ center pad and recessed from the ~~raised~~ center pad and elevated from a cavity surface

22. (currently amended) The slider of claim 3 wherein the angled side rails extend outwardly from ~~a~~the ~~raised~~ center portion ~~having a narrow width dimension to provide the narrow cross width for the raised bearing surface or surfaces proximate to the leading edge of the slider body~~.

23. (previously presented) The slider of claim 3 and comprising a leading edge stepped surface elevated from the cavity surface and recessed from the raised bearing surface or surfaces of the angled side rails.

24. (previously presented) The slider of claim 3 wherein the slider body includes a stepped bearing surface having a tapered outer profile elevated from the cavity surface and the angled side rails are formed on the tapered stepped bearing surface.

25. (previously presented) The slider of claim 28 including a stepped bearing surface or surfaces recessed from the raised surface or surfaces and elevated from the cavity surface proximate to the divergent bearing surface or surfaces to pressurize the divergent bearing surface or surfaces.

Claims 26-27 (cancelled).

28. (currently amended) The slider of claim 21 wherein the raised bearing surface or surfaces include divergent bearing surface or surfaces extending along ~~an~~the intermediate portion of the slider body.

Claim 29 (cancelled).

30. (previously presented) The slider of claim 1 wherein each of the raised bearing surface or surfaces on the leading edge portion of the slider body collectively form a narrow cross width profile within the center portion of the slider body.

AMENDMENT TO THE SPECIFICATION

Please amend the paragraph beginning on page 1, line 27 and ending on page 2, line 7.

An air bearing slider which includes a raised bearing surface contoured to limit ~~off nodal~~off-nodal pressurization. The air bearing surfaces are located proximate to nodal regions of a height field or profile between the slider and disc surface to limit off-nodal pressurization. In an illustrative embodiment, the air bearing slider includes a narrow raised bearing surface profile proximate to a trailing edge of the slider body and an expanded raised bearing surface profile along an intermediate portion of the slider body to provide lift and roll stability and limit ~~off nodal~~off-nodal pressurization. Other features and benefits that characterize embodiments of the present invention will be apparent upon reading the following detailed description and review of the associated drawings.

Please amend the paragraph beginning on page 2, line 20 and ending on page 2, line 21.

FIGS. 13-14 illustrate another embodiment of an air bearing profile for an air bearing slider to limit ~~off nodal~~off-nodal pressurization.

Please amend the paragraph beginning on page 2, line 22 and ending on page 2, line 23

FIGS. 15-17 illustrate another embodiment of an air bearing profile for an air bearing slider to limit ~~off nodal~~off-nodal pressurization.

Please amend the paragraph beginning on page 5, line 9 and ending on page 5, line 23.

FIGS. 3-4 graphically illustrate shape or profiles 150, 152 for radial coning (for $\alpha = 0.001$ and $r_c = 6$ mm) and disc waviness (for $\beta=0.002$ and $r_c = 6$ mm) relative to the slider coordinates 140, 142. As shown, the shape or profiles 150, 152 have a nodal region 154 along an

intermediate portion 156 of the slider body relative to center or nodal axis 158. Leading and trailing edge portions 160, 162 of the slider body include cross nodal regions 164, 166 relative to cross axis 170 (or a dynamic axis of the slider body about which the slider rolls). The leading and trailing edge portions 160, 162 also include ~~off nodal~~off-nodal regions 172, 174 and 176, 178 on opposed sides of the cross nodal regions 164, 166. ~~Off nodal~~Off-nodal regions 172, 174, 176, 178 have a positive 180 or negative 182 height or amplitude relative to node amplitude 184. The amplitude of the height field in the nodal region 154, 164 and 166 is relatively small in comparison to amplitude or distortion in the ~~off nodal~~off-nodal regions 172, 174, 176, 178 proximate to corners of the slider body. Thus, as described, the nodal regions of the height profile are located proximate to the intermediate portion 154 or center axis 158 and cross axis 170 of the slider body generally irrespective of the skew angle of the slider.

Please amend the paragraph beginning on page 5, line 24 and ending on page 6, line 9.

In particular, as shown in FIG. 3, radial coning of the disc produces positive off-nodal regions 172-1, 176-1 having a positive height amplitude 180-1 relative to node amplitude 184 along the inner side 136 of the slider body and negative ~~off nodal~~off-nodal regions 174-1, 178-1 having a negative height amplitude 182-1 relative to node amplitude 184 proximate along the outer side 138 of the slider body to introduce an effective cross curve or twist about cross axis 170 of the slider body. The effective cross curve or twist affects roll and fly height parameters of the slider body relative to the disc surface. The effect of the cross curve or twist due to radial coning becomes more significant for small disc dimensions or form factors relative to the nominal fly height or fly height budget of the head since the twist factor or effect increases quadratically as the radius of the disc decreases as provided by Equation 1.

Please amend the paragraph beginning on page 6, line 10 and ending on page 6, line 21.

Disc waviness based upon an azimuthal wave component as graphically illustrated in FIG. 4 introduces a positive ~~off nodal~~off-nodal region 176-2 and a negative ~~off nodal~~off-nodal region 178-2 relative to inner and outer sides 136, 138 of the slider body -proximate to the trailing edge 134 of the slider body. Positive ~~off nodal~~off-nodal region 176-2 and negative ~~off nodal~~off-nodal region 178-2 having positive and negative height amplitudes 180-2, 182-2 relative to node amplitude 184 to introduce an effective twist or cross curve along the trailing edge portion 162 of the slider body as provided by Equation 2. The phase of the twist will change as the slider body traverse around the disc since the shape or profile of the disc waviness varies relative to angle θ as provided by Equation 2. Although FIG. 4 graphically illustrates a component of disc waviness approximated by an azimuthal wave, actual disc waviness may have multiple sinusoidal components and varies with respect to time.

Please amend the paragraph beginning on page 7, line 15 and ending on page 8, line 4.

As shown, the leading edge pad 224 and trailing edge pad 226 have a narrow cross width or profile dimension 224-1, 226-1 along a cross width between opposed sides 136, 138 of the slider body to provide a raised bearing surface having a cross width dimension or profile in the cross nodal portions of the slider body to limit ~~off nodal~~off-nodal pressurization and provide a pressure profile which is less sensitive to shape variations in the slider-disc interface or height field. The opposed side pads 220, 222 have an expanded cross width profile 220-222 relative to the narrow cross width profile of the raised rearing surface along the leading and trailing edge portions to provide lift and pressurization in the nodal region along the intermediate portion 156 of the slider body. Although FIG. 5 illustrates a slider embodiment including a leading edge pad 224 having a narrow cross width profile, the leading edge pad can have a larger cross width profile since the raised bearing surfaces along the leading edge portion 160 have a smaller percentage twist effect than along the trailing edge portion 162 relative to nominal transducer spacing.

Please amend the paragraph beginning on page 8, line 4 and ending on page 8, line 19.

FIGS. 6-8 illustrate an alternate embodiment of an air bearing slider 130-6 including a contoured bearing profile according to the present invention. As shown, the slider 130-6 includes a raised bearing surface 230 elevated above a recessed or milled bearing surface 232 and a trailing edge center pad 234 having a raised bearing surface elevated above the recessed bearing surface 232. The raised bearing surface of the trailing edge center pad 234 has a narrow cross width profile 234-1 proximate to cross nodal portion 166 of the slider body. The raised bearing 230 is profiled or contoured relative to the nodal portions 164, 154 along the leading edge and intermediate portions of the slider body. The raised bearing 230 includes a raised leading edge portion 236 and raised rail portions 240, 242. The leading edge portion 236 has a narrow raised bearing surface cross profile or dimension along the leading edge portion 160 to limit pressurization of the ~~off nodal~~off-nodal regions or portions. Rails 240, 242 extend outwardly at an angle relative to the leading edge portion 236 to provide an expanded cross width profile or dimension for the raised bearing surface or surfaces along the intermediate portion 156 of the slider body to provide pressurization and roll stability along the intermediate nodal portion.

Please amend the paragraph beginning on page 9, line 7 and ending on page 9, line 21.

As shown, the raised bearing surface 230 includes a leading edge trench 258 proximate to raised leading edge portion 236 to provide air flow from the stepped bearing surface 250 to the raised bearing surface 230. The stepped bearing surface provides a stepped surface to pressurize the raised bearing surface and extends within the intermediate portion 156 of the slider body to enhance suction. The narrow cross width profile of the leading edge stepped portion 254 provides a stepped surface in the cross nodal portion to limit ~~off nodal~~off-nodal pressurization along the leading edge of the slider body. Center pad 234 also includes a leading edge trench 259 to provide air flow from stepped surface 252 to the raised bearing surface or surfaces. In an alternate embodiment, leading edge combs (not shown) could be included along a leading edge bearing surface to filter or block debris and particles. Recessed and stepped bearing surfaces are

fabricated via known milling and etching processes to provide a recessed surface below the substrate or zero milled surface of the raised bearing surface or surfaces. In particular in one embodiment the recessed or stepped bearing surfaces can be milled or etched to a depth of 0.1-0.3 microns.

Please amend the paragraph beginning on page 9, line 22 and ending on page 10, line 8.

FIGS. 9-12 illustrate an alternate air bearing slider 130-9 embodiment having a contoured bearing profile of the present invention. As shown, the slider 130-9 includes a leading edge rail portion 260 having a raised bearing surface elevated above the recessed surface 232, a trailing edge rail portion 262 and a cross rail 264 in the intermediate portion 156 of the slider body. The raised bearing surface of rail 260 has a narrow cross width profile 260-1 along the cross nodal 164 portion of the slider body. The trailing edge rail portion 262 similarly has a narrow cross width profile 262-1 along the cross nodal portion 166. Cross rail 264 has an expanded cross width profile between opposed sides 136, 138 of the slider body along the intermediate portion 156 of the slider body. Cross rail 264 has a shortened length dimension between the leading and trailing edges thereof to provide a contoured raised bearing surface in the intermediate nodal zone to limit ~~off nodal~~off-nodal pressurization.

Please amend the paragraph beginning on page 11, line 4 and ending on page 11, line 13.

FIGS. 13-14 illustrate an alternate embodiment of air bearing slider 130-13 similar to FIGS. 9-12 where like numbers are used to identify like parts in the previous FIGS. In the embodiment illustrated in FIGS. 13-14, the slider 130-13 includes a trailing edge center pad 300 having a raised bearing surface 302 elevated above a stepped pad 304. The trailing edge pad 300 has a narrow cross width dimension or profile 300-1 along the cross nodal portion of the slider body to limit ~~off nodal~~off-nodal pressurization. As shown the trailing edge pad 300 includes a leading edge trench 306 from the stepped bearing pad 304 to funnel or direct air for

pressurization of the raised bearing surface 302. Stepped pad 304 also has a narrow stepped cross width dimension or profile 304-1 as shown.

Please amend the paragraph beginning on page 11, line 14 and ending on page 11, line 23.

FIGS. 15-17 illustrate an alternate embodiment where like numbers are used to refer to like parts in the previous FIGS. As shown, the slider 130-15 includes a raised leading edge bearing pad 310 forming a raised bearing surface having a narrow cross width profile 310-1 along the leading edge portion of the slider body. Raised bearing surface of the leading edge bearing pad 310 is elevated above a stepped surface of stepped pad 312 elevated above recessed surface 232. Stepped pad 312 also has a narrow stepped cross width dimension or profile to limit ~~off nodal~~off-nodal pressurization. As shown, the raised bearing pad 310 is "U" shaped to form a leading edge trench 314 from the stepped pad 312 to provide a channel to pressurize the raised bearing pad 310.

Please amend the paragraph beginning on page 11, line 24 and ending on page 12, line 8.

The slider 130-15 includes opposed pads 320, 322 and a stepped cross rail 324 along the intermediate portion of the slider body having an expanded cross width profile in the intermediate nodal region or portion 154. In the embodiment shown, stepped cross rail 324 has side portions 326, 328 and a narrow cross portion 330. The pads 320, 322 are generally "U" shaped to provide a stepped channel 332 from stepped rail 324 to the raised bearing surfaces of the pads 320, 322 for pressurization of pads 320, 322 to provide a pressure profile having pressurized regions in the nodal regions of the slider disc interface. Pads 320, 322 are spaced to provide pressurization and roll stability along the intermediate portion of the slider body with limited ~~off nodal~~off-nodal pressurization.